

Bell Work

16.Oct.2017

What was the last science fair project you did?

Why was it such a drag?

Pre AP Chemistry Science Fair

Quiz Tomorrow, Atomic Structure

- Parts of an Atom
- Isotope/ Nuclear Symbol
- Cathode Ray Tube and Gold Foil Experiment
- Average Atomic Mass

Sci. Fair Note Book

**Each partner will
have a Sci. Fair
Note Book**

- Composition Book

- 3 Ring Binder

- Folder with paper
attached

Digital book allow only as
a back up

Set up:

Title page (First page)

Table of contents (2-3 pages)

Everyday you work on science fair start a
new day and date it, treat like a journal.

Science Fair, The Process

What you are interested in...

Find a problem

Research and discussion,
formulate a question
you can investigate

Prepare a
hypothesis
and generate
a materials list



Devise how you will test
your hypothesis
through detailed
experimental
procedures



Run your
experiment



Edit your procedures to
improve your
experimentation



Rerun experiment,
and collect
data



Analysis data, draw
conclusion against
your hypothesis

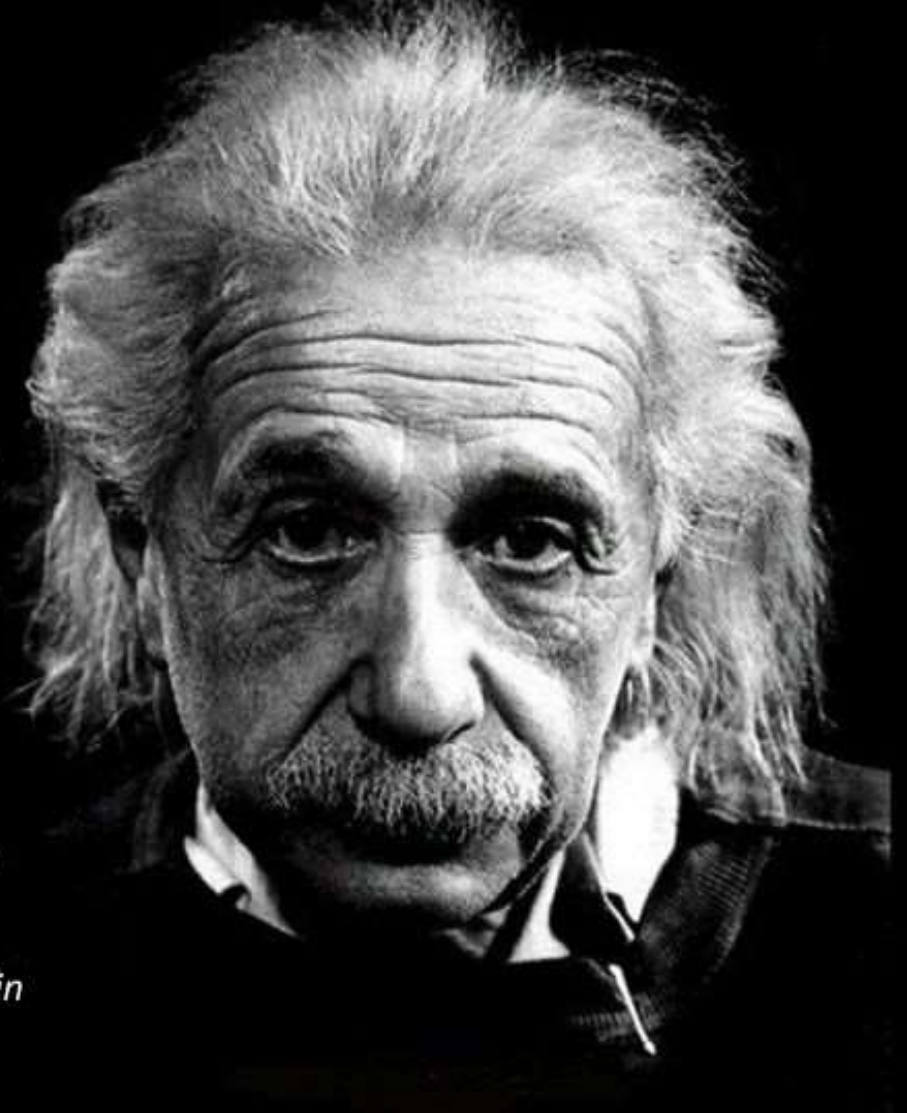


Construct your display
and prepare to
present findings

Formulating a Question

"If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask, for once I know the proper question, I could solve the problem in less than 5 minutes."

- *Albert Einstein*



Types of Questions

Comparison

- Which compost composition results in the greatest fruit production in tomatoes as measured by tomato quantity and size?
- What effect does temperature have on the strength of different types of magnets?
- How does increasing the height of a ramp affect how far a ball rolls down the ramp?

Types of Questions

Causal

- How does solute concentration affect the rate at which salt dissolves in water?
- Does the type of wood affect how long it burns?
- What is the effect of salt on the boiling temperature of water?

Types of Questions

Predictive

- Will an increase in nitrogen concentration negatively impact aquatic plant growth?
- How does increasing the height of a ramp affect how far a ball rolls down the ramp?
- Can a predictive model be made for accurately predicting the landing location of a projectile

General Goals

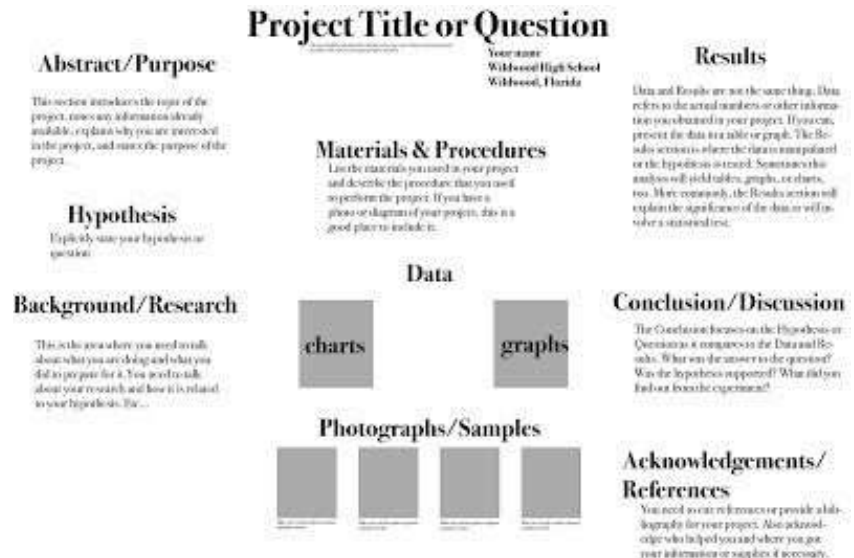
Physical Sciences (not social science)

Avoid any “opinion” or human performance investigations.

Look for a problem to answer or solve

KISS

Keep
It
Simple
Students



Semester I Due Date,

Subject to change

Can be found on class web page in Science Fair
Science fair notebook will be used for due dates

- A. Topic/ Approval, Research/ Introduction, Hypothesis, and Variables **3.Nov.2017**
- B. Experimental approval forms & Materials List and Data Collection Tables/ Charts **9.Nov.2017**
- C. Procedures ver. 1 & initial trial run completed. Preliminary data collected in Sci. Fair Book **14.Dec.2017**
- D. **Science Fair Preliminary Research Report (changes made to experimental design after trial run for you ED, engineering design initial prototype created and you are ready to build a testable working prototype!**
18.Dec.2017

*Extension available on a case by case basis.

Semester II Due Dates, *Subject to change*

E. Procedures ver. 2 completed* **26.Jan.2018****

Begin Experiment and data collection

F. Experimentation or design build and data collection completed*. **2.Feb.2018****

G. Data Tables and graphs for analysis Completes **9.Feb.2018****

H. Presentation Data Tables, Graphs with Analysis, Analysis, and Conclusions complete* **14.Feb.2018****

I. Poster Board Completed **16.Feb.2018**

*Extension available on a case by case basis.

**** suggested completion date**

Final Board

Put board together @ home, due Finished Fri. 16-Feb-18

- Every piece of writing must be typed (Abstract, Findings, Conclusion, etc.)
- Large Catchy Title & Colors
- Neat & Professional (this is not “bling” contest)
- In logical order (do not put your hypothesis at the end)
- Pictures and visual aides (Graphs, Sketches, etc)
- Typed big enough to see from 3 feet away

Where to purchase boards



Tri-fold presentation boards

Michael's Arts & Crafts:

3749 N. Ina

4070 N. Oracle

Target:

4040 N. Oracle

3901 W. Ina

Walmart:

455 E. Wetmore

7635 North La Cholla

sections to type & put on board

- Title
- Abstract
- Question
- Background Research/Introduction/ Abstract
- Hypothesis
- Materials List
- Procedures (general steps)
- Data Table(s)
- Graph(s)
- Graph Analysis
- Conclusion

Science Fair

You have already finished & need to type...

Topic- Abstract-Problem- Research- Hypothesis-
Procedures- Variables- Materials-Experiment-
Data- and Graph (and rough draft start to
conclusion)

If for some reason you haven't.... You *are* expected to do so ASAP. Do not wait for me to tell you. Just do it. Now.



Data Table

DATA TABLE

Time (min)	Average Length (mm)
0	5.0
10	4.5
20	4.0
30	3.5
40	3.0
50	2.5
60	2.5
70	2.5

Data Table Requirements:

- Has a title
- Neatly written or typed up. (on power point or Microsoft Word go to Insert→ Table→ pick # columns and rows. Enter your data.)
- Includes all data you took for the experiment

Data Table for the Cart's Motion

Trial	Time (s)	Position (cm)	Displacement (cm)	Ave. Velocity (cm/s)
1	0	0	_____	_____
2				
3				
4				
5				
6				
7				
8				
9				
10				

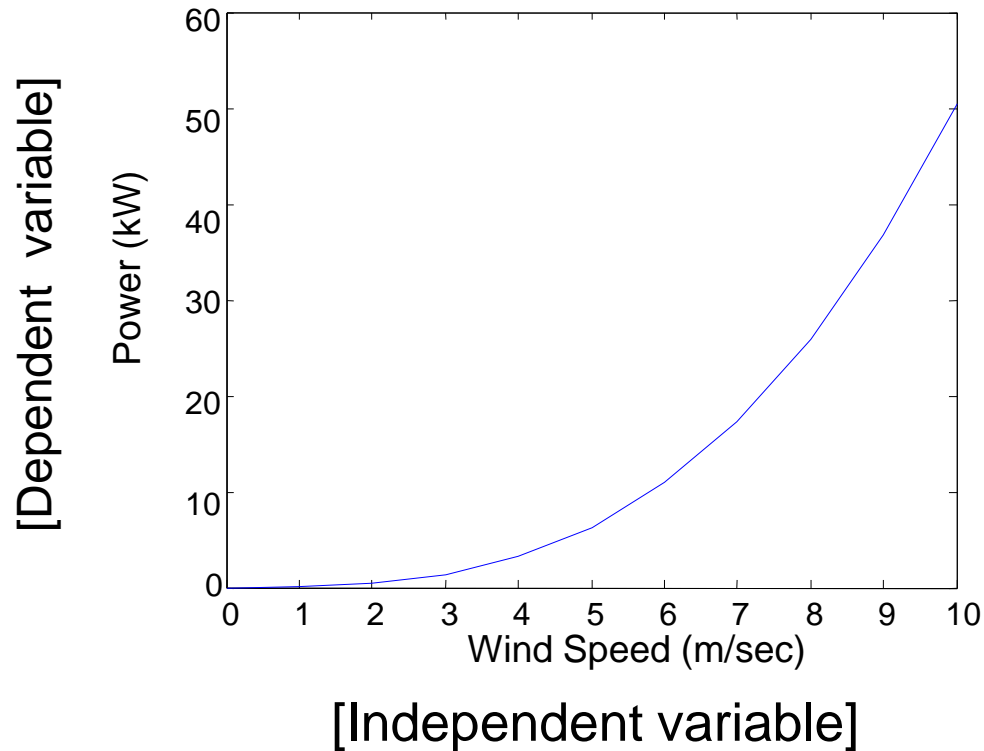
Graphs- Requirements

- Done on computer (Microsoft excel, Google Sheets, Open Office)
- Must have a title
- Y-axis and X-axis are labeled
- y-axis numbers have meaning/units (# students, mm, temperature in C, cm growth, mph etc)
- Key/ Legend
- Dependent and Independent Variables labeled
- Is visually accurate (i.e., if one chart value is 15 and another 30, then 30 should appear to be twice the size of 15).

Example

Example of a graph that draws a conclusion:

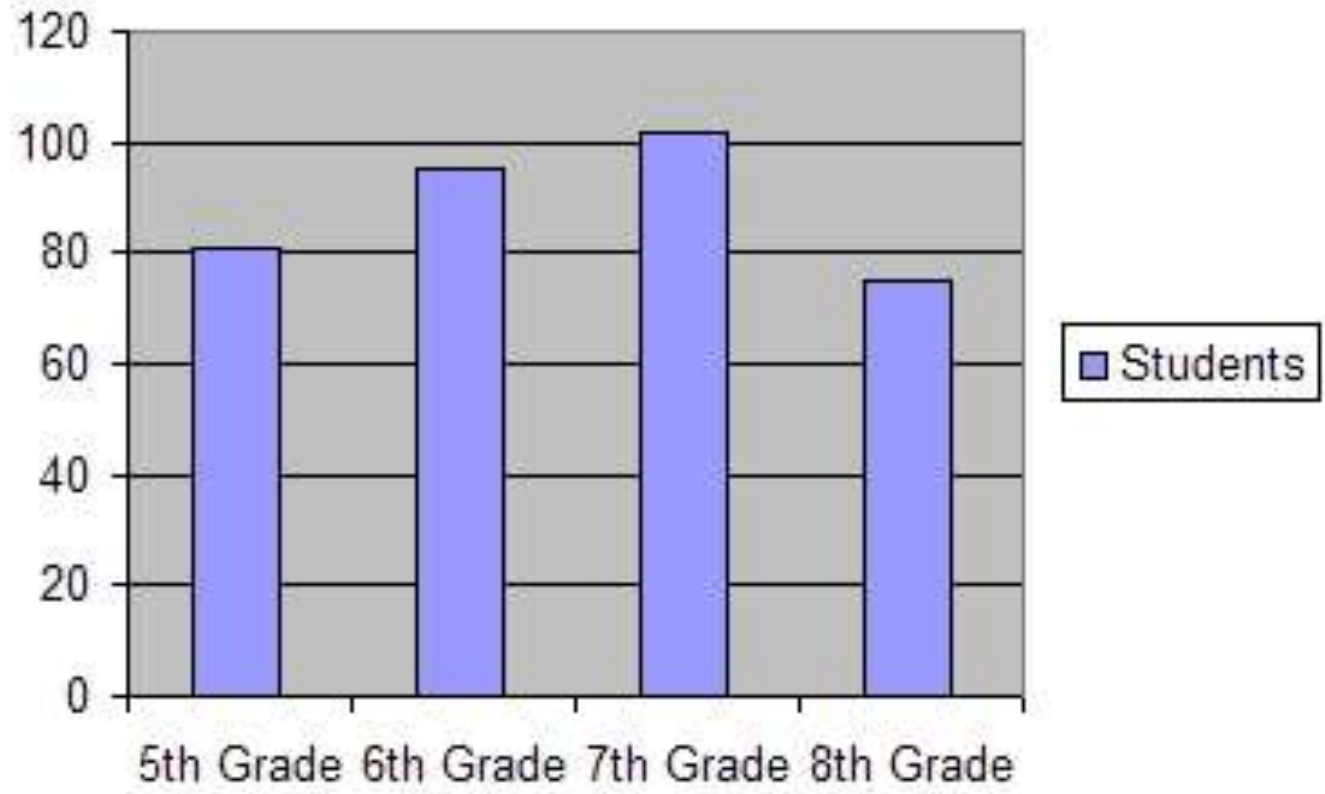
How wind generator power changes with wind speed.



Example

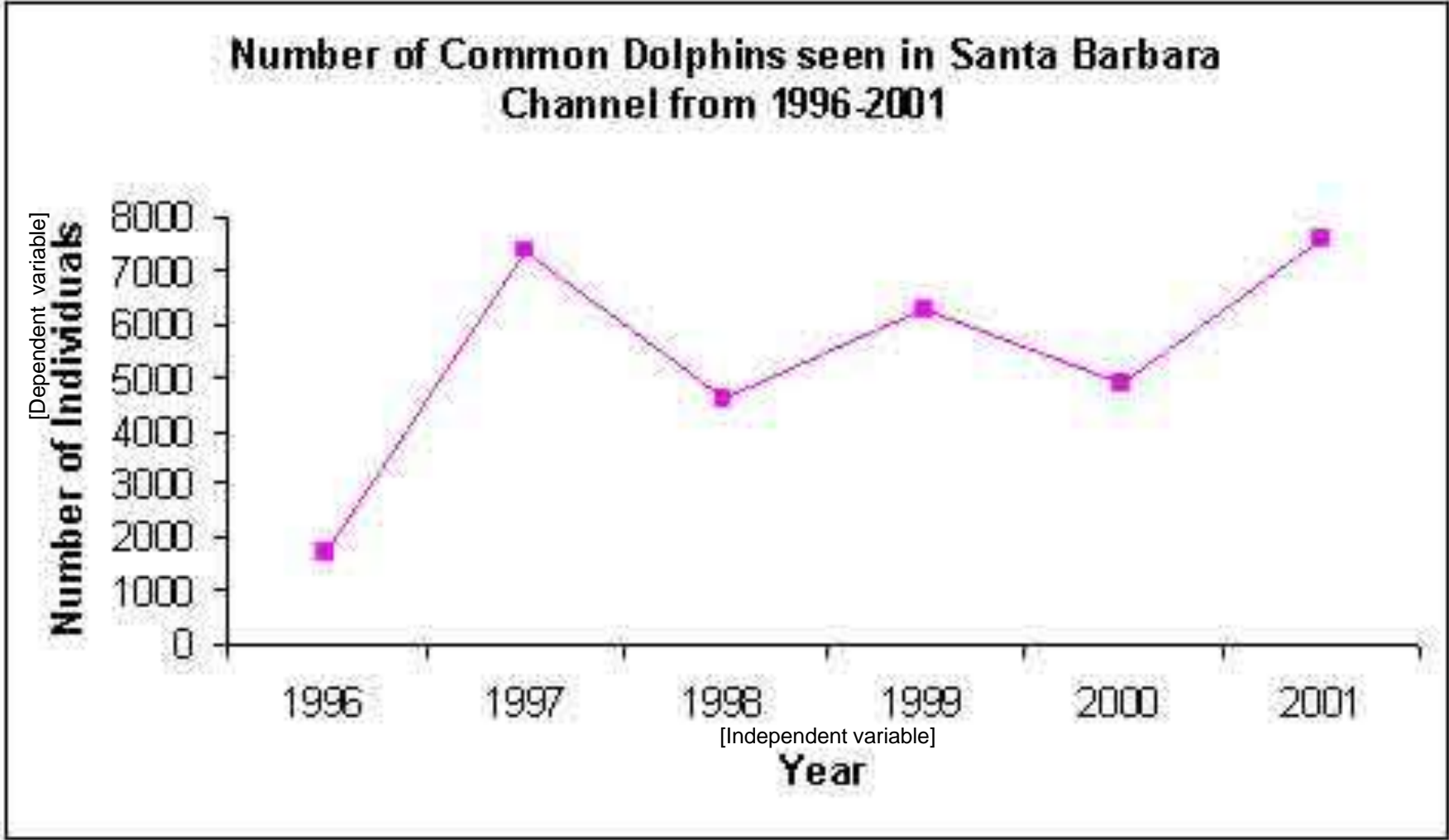
[Dependent variable]
Students

Students Taking Bus



Grade Level
[Independent variable]

Example



Graph Analysis

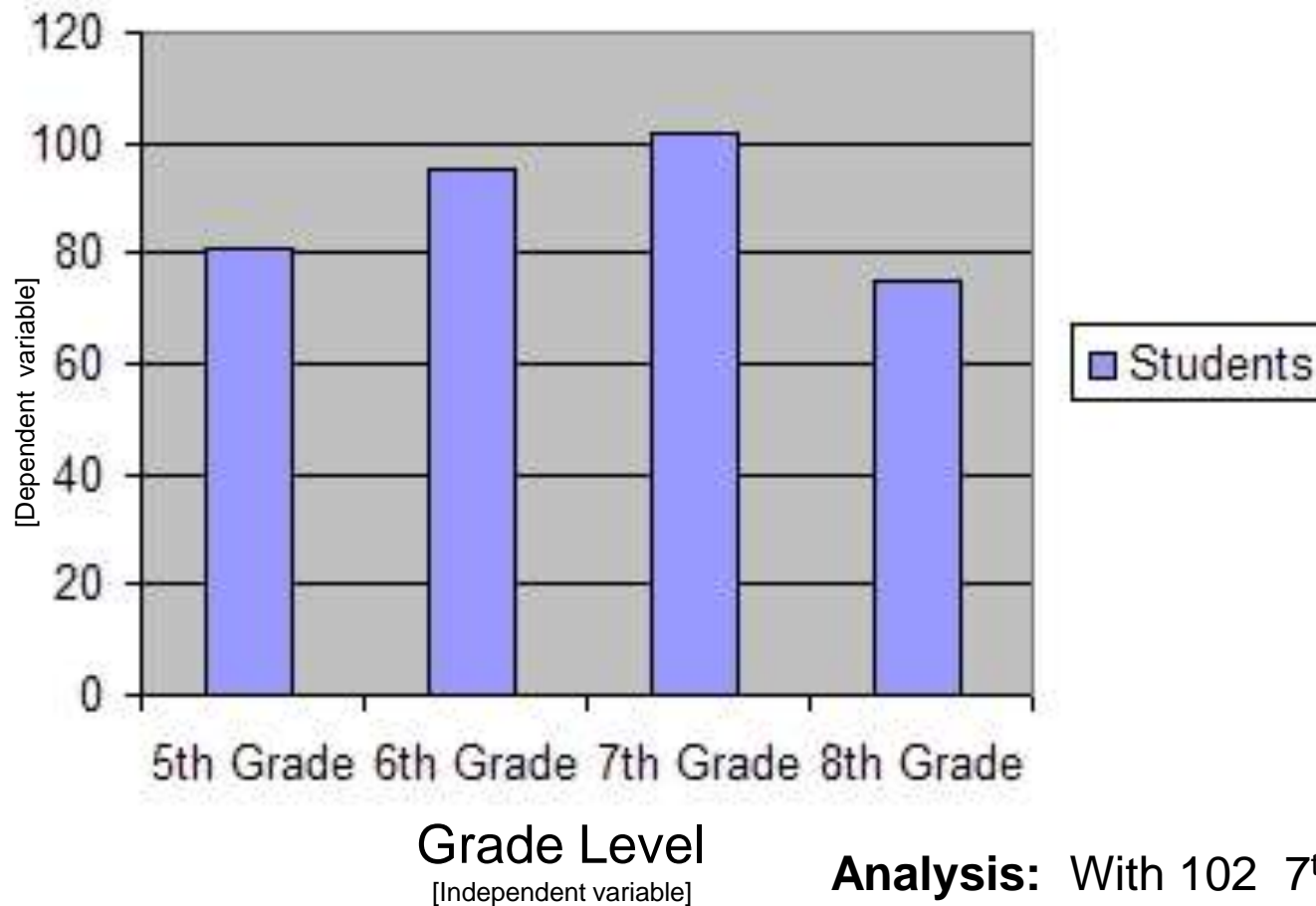
- Summarize your graph in words
- Facts about your data.
 - “The growth of plant A which was exposed to rock music for two weeks was 13 mm”.
 - “Particle board held 13lbs before breaking, metal 25lbs, and paper 1lb”.
 - “The age group 13-25 year olds on average remembered 50 notes of a song after 2 weeks while 25-50 year olds remembered 37”.

Look for Most, Least, or Trends in the data. Avoid subjective terms like “worst”, “best”. Report only objective findings.

Do Not make any statements using “because”, “why” etc. Save interpretation for the Conclusions.

Example

Students Taking Bus



Analysis: With 102 7th grade students taking the bus, they had the highest ridership of any of the grade levels studied. In general, bus ridership increases from 5th-7th, but decreases once students enter 8th grade.

Conclusion- Requirements

- Must be typed, use **3rd person** (no “I think”, “my data”, etc.)
- Answer the original question (use this as a topic sentence)
- Do you accept or reject your hypothesis.... Why?
- Interpret the results of your experiment (explain the data)
- Include Why you achieved those results

Conclusion- Requirements, cont.

- What worldly (bigger) conclusions can you draw from these results? What have we learned from this project?
- Confounding factors (errors- not *possible errors*, what actually happened that was an error?)
- How could those errors have affected your data and results?
- How can we build off of this experiment- what are some related questions/experiments to investigate next?

Done!

